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EXAMINER

MARMOR II, CHARLES ALAN

ART UNIT	PAPER NUMBER
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3736

DATE MAILED: 03/26/2004

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/035,428

Applicant(s)

HASHIMSHONY, DAN

cd

Examiner

Charles A. Marmor, II

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 January 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: “3b” and “3b” included in Fig. 1b and “31a” included in Fig. 4. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: “10” as mentioned at page 15, line 5 and “15a” as mentioned at page 16, line 2 and page 17, line 4. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
3. The drawings are objected to because in Figure 8 reference sign “51” (leftmost occurrence) apparently should read --54--. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities:

- a. On page 7, line 6, "biop" apparently should read --biopsy--.
- b. On page 22, line 14, "51" apparently should read --50--.

Appropriate correction is required.

5. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the specification fails to provide proper antecedent basis that the transmission line is a coaxial cable having an outer conductor connected to the outer conductor of the probe and an inner conductor connected to the inner conductor of the probe, as claimed in claims 15 and 30.

6. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

7. Claim 1 is objected to because of the following informalities:

- a. In line 1, "it" apparently should read --the examined tissue--.
- b. In line 2, "the" (second occurrence) apparently should be deleted.

Appropriate correction is required.

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8. Claim 6 is objected to because of the following informalities:

- a. In line 1, "it" apparently should read --the examined tissue--.
- b. In line 2, "the" (second occurrence) apparently should be deleted.

Appropriate correction is required.

9. Claim 10 is objected to because of the following informalities: in line 2, a period apparently should be inserted following "cavity". Appropriate correction is required.

10. Claim 12 is objected to because of the following informalities: in line 4, "the" (first occurrence) apparently should be deleted. Appropriate correction is required.

11. Claim 21 is objected to because of the following informalities:

- a. In line 1, "it" apparently should read --the examined tissue--.
- b. In line 2, "the" (second occurrence) apparently should be deleted.

Appropriate correction is required.

12. Claim 23 is objected to because of the following informalities: in line 2, "of" (first occurrence) apparently should read --a--, and --for-- apparently should be inserted following "projections". Appropriate correction is required.

13. Claim 27 is objected to because of the following informalities: in line 3, "the" (first occurrence) apparently should be deleted. Appropriate correction is required.

Claim Rejections - 35 USC § 112

14. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

15. Claims 1-38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "said reflected electrical pulse" in line 7. There is insufficient antecedent basis for this limitation in the claim. There is no "reflected *electrical* pulse" recited in the claim prior to this recitation.

The term "slightly" in claim 2 is a relative term which renders the claim indefinite. The term "slightly past" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. One cannot be certain to what degree the outer conductor extends past the inner conductor in the axial direction.

Claim 4 recites the limitation "said tip of the inner conductor" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. The inner conductor is not disclosed as having a tip in claims 1, 2 or 4 prior to this recitation.

The term "slightly" in claim 6 is a relative term which renders the claim indefinite. The term "slightly past" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably

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apprised of the scope of the invention. One cannot be certain to what degree the outer conductor extends past the inner conductor in the axial direction.

Regarding claim 19, in line 5, it is unclear what is examined.

The term "slightly" in claim 21 is a relative term which renders the claim indefinite. The term "slightly past" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. One cannot be certain to what degree the outer conductor extends past the inner conductor in the axial direction.

Further regarding claim 21, in line 10, it is unclear whether the term "therefrom" is intended to refer to the generator, the opposite end of the probe, the cavity, the fringe field or the examined tissue.

Claim 28 recites the limitation "the samples" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim. There are no samples recited in the claims prior to this recitation.

Claim 28 recites the limitation "said plurality of spaced time intervals" in line 3. There is insufficient antecedent basis for this limitation in the claim. There are no spaced apart time intervals recited in the claims prior to this recitation.

Regarding claim 32, the limitation "said data processor compares the reflected electrical pulses and compares them to the applied electrical pulses" is unclear and ambiguous.

Claim Rejections - 35 USC § 102

16. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

17. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Burdette et al.

Burdette et al. teach a method of examining tissue in order to differentiate the examined tissue from other tissue according to the dielectric properties of the examined tissue. In the method, an electrical pulse is applied to the tissue to be examined via a probe such that the probe generates an electrical fringe field in the examined tissue and produces a reflected pulse therefrom. The method is performed such that radiation penetrating into other tissues or biological bodies near the examined tissue, including tissues of personnel, is limited. The reflected electrical pulse is detected, and electrical characteristics of the reflected electrical pulse are compared to electrical characteristics of the applied electrical pulse in order to provide an indication of the dielectric properties of the examined tissue.

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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19. Claims 21, 22, 26, 27, 30, 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan et al. ('971) in view of Berube ('302).

Chan et al. teach an apparatus for measuring dielectric properties of materials, such as biological materials and cultural materials. The apparatus includes a probe having an inner conductor 2 insulated from, and enclosed by, an outer conductor 3; a transmission line 10 at the opposite end of the probe; a pulse generator for applying an electrical pulse which generates an electrical fringe field at the distal end of the probe; a detector for detecting a reflected electrical pulse at the distal end of the probe; and a data processor for comparing electrical characteristics of the reflected electrical pulse with respect to the applied electrical pulse to produce an indication of the dielectric properties of the examined material. The data processor compares changes in the time-domain characteristics of the two electrical pulses. The transmission line is a coaxial cable having an outer conductor connected to the outer conductor of the probe and an inner conductor connected to the inner conductor of the probe. The outer conductor is of cylindrical configuration. The inner conductor is mounted within the outer conductor by a fluorinated ethylene polymer dielectric material 13. Chan et al. teach all of the limitations of the claims except that the outer conductor extends farther axially than the inner conductor so as to form a cavity in the distal end of the probe.

Berube teaches an end-firing microwave ablation instrument including a probe having an inner conductor 17 insulated from, and enclosed by, an outer conductor 16 having an open end that extends past the inner conductor in the axial direction to define a cavity 27 at one end of the probe. This configuration of the probe allows an electromagnetic field to be delivered to targeted tissues without impacting the surrounding untargeted tissues.

It would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to form the outer conductor of a probe similar to that of Chan et al. so that it extends axially past the inner conductor to form a cavity in the distal end of the probe in view of the teachings of Berube in order to provide a probe end that facilitates delivery of the electrical fringe field to targeted tissues while limiting the radiation exposure of surrounding untargeted tissues.

Allowable Subject Matter

20. Claims 2-5, 23-25, 28, 29, 31, 32 and 36-38 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

21. Claims 6-20 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

22. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 2-20, no prior art of record teach or fairly suggest methods of examining tissue in order to differentiate the examined tissue from other tissue according to the dielectric properties of the examined tissue, as claimed by Applicant, where an electrical pulse is applied to the tissue to be examined via a probe having an inner conductor insulated from and enclosed by an outer conductor that extends axially past the inner conductor to define an open cavity at one end of the probe, such that the probe generates an electrical fringe field in the

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cavity and in examined tissue with negligible radiation penetrating into other tissues or biological bodies near the examined tissue.

Regarding claims 23 and 24, no prior art of record teach or fairly suggest a system for differentiating tissue according to the dielectric properties of the tissue, as claimed by Applicant, where the tip of the inner conductor carries of plurality of thin, electrically-conductive projections enhancing the electrical fringe field.

Regarding claim 25, no prior art of record teach or fairly suggest a system for differentiating tissue according to the dielectric properties of the tissue, as claimed by Applicant, where the outer conductor decreases in diameter at the open cavity end of the probe.

Regarding claims 28 and 29, no prior art of record teach or fairly suggest a system for differentiating tissue according to the dielectric properties of the tissue, as claimed by Applicant, where the data processor transforms the samples of the two electrical pulses at a plurality of spaced time intervals by a FFT function to values in the frequency domain of amplitude and phase for each frequency; and then uses the equation $\Gamma(\omega) = E(\omega)_{\text{reflected}} / E(\omega)_{\text{incident}}$ to calculate the reflection coefficient in the frequency domain.

Regarding claim 31, no prior art of record teach or fairly suggest a system for differentiating tissue according to the dielectric properties of the tissue, as claimed by Applicant, where the pulse generator generates and applies an electrical pulse of a duration of the order of nanoseconds or picoseconds.

Regarding claim 32, no prior art of record teach or fairly suggest a system for differentiating tissue according to the dielectric properties of the tissue, as claimed by Applicant, where the pulse generator generates and applies a series of electrical pulses at a pulse repetition

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rate of a few Herz to a few giga-Hertz and the data processor compares detected reflected electrical pulses to the applied electrical pulses to provide an indication of the dielectric properties of the examined tissue.

Regarding claim 36, no prior art of record teach or fairly suggest a system for differentiating tissue according to the dielectric properties of the tissue, as claimed by Applicant, where the data processor compares the dielectric properties of the examined tissue with previously stored dielectric properties of known normal and cancerous tissues.

Regarding claims 37 and 38, no prior art of record teach or fairly suggest a system for differentiating tissue according to the dielectric properties of the tissue, as claimed by Applicant, where data processor first compares dielectric properties of the examined tissue with previously stored dielectric properties of known normal and cancerous tissues in a first level of characterization of the examined tissue; and then effects a second level of characterization of the examined to reduce ambiguities by comparing the Cole-Cole parameters of the examined tissue with those previously stored for the various types of normal and cancerous tissues.

Conclusion

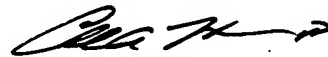
23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. King et al. ('730) teach microwave needle dielectric sensors. Skladnev et al. ('323) teach a probe for characterizing tissue types. Campbell et al. ('426) teach a method and apparatus for measuring the relative hydration of a substrate.

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24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles A. Marmor, II whose telephone number is (703) 305-3521. The examiner can normally be reached on M-TH (7:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mary Beth Jones can be reached on (703) 308-3400. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Charles A. Marmor, II
Primary Examiner
Art Unit 3736

cam
March 22, 2004